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"Welcome Shelter Near Trail's End"

FEDERAL-STATE COOPERATIVE
SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

COLORADO RIVER DRAINAGE BASIN

MARCH 1, 1947

By

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.

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Report Prepared by
Division of Irrigation
Soil Conservation Service
and
Colorado Agricultural Experiment Station
Fort Collins, Colorado

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March 1, 1947

WATER SUPPLY OUTLOOK

COLORADO RIVER DRAINAGE

Snow cover on the headwaters of the Colorado River and its tributaries in Colorado, as shown by March 1 snow surveys, is above normal with the exception of the Yampa River drainage. The water stored in snow at higher elevations is greater than a year ago. The valley areas of the Yampa, White, Animas and Dolores River are snow covered. Soil moisture and crop conditions are fair to good. Recent precipitation has been generally sub-normal. On the Green River watershed in Wyoming snow water content is above normal and about the same as last year. Precipitation at lower elevations is well above normal. Part of the range area is snow covered. Drought conditions continue in Arizona and western New Mexico. Precipitation is sub-normal and practically no snow is reported. Reservoir storage is very low.

COLORADO RIVER AND
TRIBUTARIES IN COLORADO

Colorado River (Above Grand Junction). The snow cover on the Colorado River watershed, above Grand Junction, is 10 percent above normal and 17 percent greater than last year at this time. Snow on Grand Mesa is still above normal and the increase in depth near the Continental Divide during the month of February has been very good. The water supply outlook is somewhat better than on February 1. Precipitation in valley areas is generally sub-normal, but the stream flow is reported to be about average. Crop and range conditions are favorable and improving. Storage in Green Mountain reservoir is 74,700 acre-feet, which is about 8,000 acre-feet more than a year ago.

Gunnison River. The water content of the snow on the headwaters of the Gunnison increased about 50 percent during the month of February. The major increase has been on courses near the Continental Divide in the east and south portions of the watershed. The snow cover is now above normal and 68 percent over a year ago. Snow on the Iron-ton Park course, near Red Mountain Pass, is twice as deep as on February 1. Precipitation is slightly below normal in the valley areas. Soil moisture and crop conditions are reported as fair. In general the prospects for above normal summer flow in this stream are excellent due to improved conditions during the past month.

Yampa and White Rivers. The watershed of the Yampa River remains the only area where the snow cover is not above normal at high elevations. Recent snow surveys show the water content to be practically the same as a year ago and only slightly below average. The deficiency of snow north and east of Steamboat Springs has been eliminated. About normal runoff may be expected because the upper valley has been snow covered during the winter

season and the depth has recently increased. Precipitation has been about normal. Soil moisture conditions are excellent. Conditions on the White River are similar to the Yampa except that the water content of the snow near the rim of the watershed is somewhat above normal and 25 percent greater than March 1, a year ago.

San Juan and Animas Rivers. The accumulation of snow at the high elevations on the watershed of the San Juan River during February has been a little above average. There was a good increase of snow cover on the Animas watershed where the depth is twice as great as last month. Prospects for the San Juan water supply are diminished somewhat because of subnormal conditions on the headwaters of this stream and below average precipitation on the New Mexico tributaries. Precipitation at Durango is approximately normal. Soil moisture and crop conditions are reported to be good. The storage in Vallecito reservoir is 58,300 acre-feet which is 20,000 acre-feet above March 1, 1946. The overall situation is much better than at this time last year.

Dolores River. From limited snow surveys on the headwaters of Dolores River, the water supply outlook is much improved over a year ago but snow water content is only 88 percent of normal. Precipitation in Cortez area was below normal during February but soil moisture and crop conditions are good. Storage in Groundhog Reservoir is slightly under March 1, 1946.

GREEN RIVER IN WYOMING

From limited snow surveys on the Green River watershed it is found that the water content of the snow is about 10 percent above normal and much the same as last year. Precipitation at lower elevations has been well above normal through the winter season. About 60 percent of the range area is now snow covered. Soil moisture and range conditions are reported as good. Stream flow is low due to ice conditions. It is expected that the summer flow of the Green River will be somewhat above average and higher than last season.

COLORADO RIVER AND TRIBUTARIES IN ARIZONA

The drought condition in Arizona continued during February. There has been practically no snow reported from any of the higher elevations on the watersheds of the Gila, Salt, Little Colorado and Williams Rivers. Precipitation has been definitely sub-normal with a little rain and snow at the end of the month. Soil moisture conditions are reported from fair to poor. Ranges are dry and in poor condition. Storage in the major reservoirs continues to be extremely low. Storage in four major reservoirs on the Salt River is now 429,000 acre-feet as compared with 700,000 a year ago. In San Carlos reservoir, on the Gila River, there is now in storage 18,000 acre-feet. Last year there was 30,000, and the average for the past ten years, as of March 1, is 265,000. Unless unusually high precipitation falls in this area, the water supply will be low.

Storage in Lake Mead, as of March 1, was 16,692,000 acre-feet or about 4,500,000 acre-feet under last year.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

COLORADO RIVER BASIN

STATUS OF RESERVOIR STORAGE, MARCH 1, 1947

BASIN AND STREAM	RESERVOIR	USABLE CAPACITY (Thous.A. Ft.)	THOUSANDS ACRE FEET IN STORAGE About March 1, 1947			
			1947	1946	1945	1944
COLORADO DRAINAGE	Taylor Park	106.2	68.4	83.4	60.9	85.0
	Vallecito	126.3	58.3	38.7	8.1	28.7
	Groundhog	21.7	8.0	8.5	8.0	15.0
	Green Mountain	146.9	74.7	66.8	70.1	56.5
	Lake Mead	27935.0	16692.0	2126.3**		
	Lake Havasu	688.0	604.8	615.5**		
SALT AND GILA DRAINAGE	Roosevelt	1420.0	133.6	433.8	606.9	760.2
	Horse Mesa	245.1	229.0	224.3	223.4	230.8
	Mormon Flat	58.0	39.0	31.4	35.5	47.0
	Stewart Mt.	70.0	28.1	10.8	22.2	34.5
	Bartlett	200.0	11.3	1.8	15.6	48.6
	Carl Pleasant	173.0		3.6	8.3	17.9
	San Carlos	1200.0	18.3	29.9	107.5	280.9

10-year-avg.
1936-45*

*Some for shorter periods

**March 15, 1946

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

COLORADO RIVER BASIN

March 1, 1947

SUMMARY OF MARCH 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth		Water Content		Number Courses in Average	Snow Density		1947 Water Content in percent of	
	Twelve year Avg.*	1946	1947	Twelve year Avg.*		1946	1947	Twelve year Avg.*	
	In.	In.	In.	Percent		Percent	Percent	Percent	
COLORADO RIVER	In.	In.	In.	In.		Percent	Percent		
Colorado River**	44.0	38.2	52.2	10.9	22	25	27	23	110
Yampa River	61.5	47.6	61.6	13.9	4	23	30	22	99
White River	41.8	41.4	65.8	13.4	2	32	28	22	109
Roaring Fork	38.0	33.1	48.7	9.6	3	25	27	23	116
Gunnison River	43.3	28.3	51.9	12.6	9	29	28	26	105
Uncompahgre River	38.0	20.9	45.6	11.0	1	29	28	25	103
Dolores River	32.7	20.9	33.2	8.0	2	24	24	21	88
San Juan River	45.6	21.4	44.4	13.1	5	29	25	24	88
Animas River	30.8	11.0	38.3	8.1	3	26	28	22	105
Gila River	6.3	0.7	0	1.7	7	27	28
Salt River	6.8	0.6	1.4	1.9	5	28	33	21	16
Green River	39.7	42.3	42.8	10.5	3	26	28	28	113

*Some for shorter periods.

**Above Grand Junction

*Some for shorter periods.

**Above Grand Junction

P R E C I P I T A T I O N D A T A

WATERSHED	STATE	Precipitation*		Departure from Normal		Precipitation*		Departure from Normal	
		October 1 to February 28		Inches		February		Inches	
Colorado	Colorado	Inches		8.12		1.64		-0.13	
Green	Wyoming			5.54		0.65		-0.04	
San Juan	New Mexico			2.91		0.40		-0.44	
Colorado	Arizona			4.79		0.30		-1.22	
Gila	New Mexico			2.54		0.13		-0.70	

The accumulated precipitation since October 1 over the watershed of the Colorado River was below normal except on the Colorado River drainage in Colorado and on the Green River drainage in Wyoming. Precipitation was below normal over the entire drainage basin for February.

*Precipitation tentative

COLORADO RIVER SNOW SURVEYS, MARCH 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION				Elev.	Date of Survey	Snow Depth (Inches)	SNOW COVER MEASUREMENTS		Years of Record	Past Record Av. Water Content (Inches)
	No. and State	Sec.	Twp.	Range				Water Content (Inches)	1945		
COLORADO RIVER (Above Grand Junction)											
Park View*	7 Colo.	24	5N	78W	9200	2/28	41.8	1947	1945	12	7.3
Phantom Valley	12 "	7	5N	75W	9300	3/2	36.9	9.1	6.4	12	8.2
Berthoud Pass	16 "	35	2S	75W	9700	2/27	54.6	11.8	8.1	12	12.3
Tennessee Pass*	19 "	21	8S	80W	10200	2/27	45.0	18.1	11.1	12	7.2
Ind. Pass Tunnel	33 "	30	11S	82W	10200	2/27	61.3	17.4	5.8	12	13.3
N. Lost Trail Cr.	34 "	20	11S	87W	9200	3/3	53.8	10.8	10.4	12	10.1
M. Fork Camp Gr.	37 "	16	3S	77W	9000	3/3	32.6	7.5	11.6	12	8.0
Fiddler Gulch	44 "	1	8S	80W	11000	3/1	56.0	14.0	7.8	12	11.8
Nast	45 "	1	9S	83W	8700	2/28	31.0	5.2	9.4	12	5.5
Mesa Lakes	56 "	35	11S	96W	10000	2/28	46.1	13.5	4.0	11	13.0
Lulu	59 "	25	6N	76W	10200	3/2	57.9	13.7	14.1	10	13.4
Willow Creep P.	62 "	1	4N	78W	9500	2/28	50.7	12.0	10.9	10	9.2
N. Inlet Grand L.	64 "	26	4N	75W	9000	3/1	42.5	8.8	9.3	10	7.1
Lake Irene	65 "	8	5N	75W	10600	2/28	69.5	13.4	15.8	10	15.3
Thunderbolt Peak	66 "	22	2N	74W	9500	3/3	54.4	15.8	16.5	10	12.7
Arrow	69 "	34	1S	75W	9900	2/27	41.4	8.9	9.0	10	7.6
Lapland	70 "	16	2S	76W	9300	3/3	45.9	9.9	8.9	8	8.7
Fremont Pass #2	79 "	2	8S	79W	11400	3/3	64.5	13.4	8.6	6	12.6
Trickle Divide	85 "	23	11S	94W	10000	2/28	86.0	24.5	24.0	8	21.1
Lynx Pass No. 2	91 "	27	2N	83W	9100	2/28	51.1	10.2	8.1	12	10.3
Shrine Pass	96 "	15	6S	79W	10500	3/3	64.5	13.7	10.6	6	12.5
Grizzly Peak	97 "	2	5S	76W	11250	3/3	58.3	15.0	10.8	6	13.2
Ivanhoe	100 "	12	9S	82W	10400	3/1	63.5	16.9	--	2	12.8
Glen-Mar Ranch	102 "	31	12S	77W	8850	3/3	35.4	8.8	--	1	8.8
			Average for drainage				52.2	12.0	10.4		10.9
YAMPA RIVER											
Dry Lake	6 Colo.	26	7N	84W	8200	3/3	66.6	12.0	15.4	9	14.9
Columbine Lodge*	8 "	21	5N	82W	9300	3/3	72.5	17.8	17.6	12	17.8
Elk River	9 "	6	10N	85W	8700	3/1	56.0	14.8	15.2	9	12.7
Lynx pass No. 2*	91 "	27	2N	83W	9100	2/28	51.1	10.2	8.1	12	10.3
			Average for Drainage				61.6	13.7	14.1		13.9
WHITE RIVER											
Burro Mountain	35 Colo.	15	2S	91W	9000	3/4	68.7	14.9	13.4	12	14.9
Rio Blanco	36 "	28	1N	88W	8500	2/28	62.8	14.2	9.2	9	12.0
			Average for drainage				65.8	14.6	11.8		13.4
*On adjacent drainage											

*On adjacent drainage

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COLORADO RIVER SNOW SURVEYS, MARCH 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION				SNOW COURSE MEASUREMENTS							
	No. and State	Sec.	Twp. Lat.	Range Long.	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)			Years of Record	Past Record Av. Water Content (Inches)
								1947	1946	1945		
COLORADO RIVER												
ROARING FORK												
Ind. Pass Tunnel	33 Colo.	30	11S	82W	10200	2/27	61.3	17.4	13.3	10.4	12	13.3
N. Lost Trail Cr.	34 "	20	11S	87W	9200	3/3	53.8	10.8	9.0	11.6	12	10.1
Nast	45 "	1	9S	83W	8700	2/28	31.0	5.2	5.1	4.0	12	5.5
Ivanhoe	100 "	12	9S	82W	10400	3/1	63.5	16.9	8.6	--	2	12.8
				Average for drainage			48.7	11.1	9.1	8.7		9.6
GUNNISON RIVER												
Crested Butte	18 Colo.	22	13S	86W	9000	2/28	51.0	10.2	7.5	10.7	12	11.4
Marshall Creek	42 "	24	48N	6E	10800	3/1	41.7	8.5	6.4	10.3	12	9.7
Poncha Creek*	43 "	19	48N	7E	10500	3/1	26.5	6.0	4.5	9.7	12	8.0
Park Cone	46 "	19	14S	82W	9700	3/1	43.6	7.4	5.5	--	11	7.2
Alexander Lake	53 "	2	12S	95W	10000	2/27	68.9	21.0	10.3	19.3	11	17.6
Snowshoe Mesa	55 "	14	13S	89W	7500	2/28	22.9	6.5	5.4	7.0	11	7.9
Ironton Park	58 "	29	43N	7W	9800	3/3	45.6	11.3	5.9	9.6	11	11.0
Trickle Divide	85 "	23	11S	94W	10000	2/28	86.0	24.5	14.1	24.0	8	21.1
Park Reservoir	87 "	34	11S	94W	9500	2/28	81.4	24.0	11.3	22.2	8	19.7
Porphyry Creek	89 "	19	49N	6E	10800	2/28	54.5	11.1	--	12.8	7	12.5
Sunshine Mt. No. 2	94 "	35	44N	6W	10200	--	--	--	11.0	6.7	--	--
Kannah Creek	101 "	5	12S	95W	10700	2/27	66.2	19.7	--	--	1	19.7
				Average for drainage			51.9	13.3	7.9	14.1		12.6
UNCOMPAHGRE RIVER												
Ironton Park	58 Colo.	29	43N	7W	9800	3/3	45.6	11.3	5.9	9.6	11	11.0
SAN JUAN RIVER												
Wolf Creek Pass*	26 Colo.	4	37N	2E	10000	2/28	70.6	20.0	10.0	20.9	11	21.6
Upper San Juan	29 "	10	37N	1E	10000	2/28	78.1	21.6	10.9	23.8	10	23.2
Silverton Sub. S.	30 "	10	41N	7W	9400	2/28	25.1	5.2	0.5	3.8	9	4.6
Cascade	31 "	12	39N	9W	8850	2/28	44.1	9.0	2.8	8.7	9	8.8
Granite Peaks	93 "	24	37N	6W	7950	3/1	3.9	0.6	2.0	5.3	7	7.4
Chama Divide*	17 N. Mex.		36.9N	106.7W	7750				0.9	6.2		
Chamita*	18 "		36.9N	106.7W	8500				2.7	11.1		
				Average for drainage			44.4	11.3	5.2	12.5		13.1

*On adjacent drainage

*On adjacent drainage

COLORADO RIVER SNOW SURVEYS, March, 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION					Date of Survey	Snow Fepth (Inches)	SNOW COURSE MEASUREMENTS				Past Record Av. Water Content (Inches)
	No. and State	Sec.	Twp.	Range	Elev.			Water Content (Inches)			Years of Record	
								1947	1946	1945		
LOLORES RIVER							COLORADO RIVER					
Rico	23 Colo.	11	39N	11W	8700	3/1	29.2	6.3	5.7	6.9	9	6.7
Telluride	24 "	6	42N	8W	8600	3/1			4.2	6.1		
Lizard Head	25 "	24	41N	10W	10300	3/1			6.9	11.5		
Lone Cone	90 "	23	41N	13W	8900	3/1	37.3	7.8	5.8	9.1	7	9.3
				Average for drainage			33.2	7.0	5.0	7.6		8.0
ANIMAS RIVER												
Silverton SS	30 Colo.	10	41N	7W	9400	2/28	25.1	5.2	0.5	3.8	9	4.6
Cascade	31 "	12	39N	9W	8850	2/28	44.1	9.0	2.8	8.7	9	8.8
Ironton Park*	48 "	29	43N	9W	9800	3/3	45.6	11.3	5.9	9.6	11	11.0
				Average for drainage			38.3	8.5	3.1	7.4		8.1
GILA RIVER												
Frisco Divide	11 N.Mex.	31	6S	20W	8000	3/1	0	0	0.5	3.7	10	2.0
State Line	14 "	6	6S	21W	8000	3/1	0	0	0.2	4.2	10	2.3
Taylor Creek	22 "	20	10S	10W	7850	3/3	0	0	0.0	0.0	6	0.1
Inman	23 "	6	11S	10W	7800	3/3	0	0	0.0	--	2	0.0
Nutriosio	3 Ariz.	23	6N	30E	8500	3/1	0	0	0.5	1.5	10	1.8
Beaver Head	4 "	13	4N	30E	8000	3/3	0	0	0.0	3.3	9	2.8
Coronado Trail	5 "	26	5N	30E	8000	3/1	0	0	T	3.4	10	3.2
				Average for drainage			0	0	0.2	2.7		1.7
SALT RIVER												
Mc Nary	6 Ariz.	14	8N	23E	7200	3/1	4.1	0.8	0.4	1.5	9	2.5
Forestdale	7 "	2	9N	21E	6000	3/1	0	0	0.3	0.3	9	1.1
Milk Ranch	9 "	28	8N	23E	7000	3/1	2.7	0.5	0.0	0.1	6	1.0
Nutriosio*	3 "	23	6N	30E	8500	3/1	0	0	0.5	1.5	10	1.8
Coronado Trail*	5 "	26	5N	30E	8000	3/1	0	0	T	3.4	10	3.2
				Average for drainage			1.4	0.3	0.2	1.4		1.9

*On adjacent drainage

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COLORADO RIVER SNOW SURVEYS March 1, 1947

DRAINAGE BASIN and SNOW COURSE	LOCATION			Date of Survey	SNOW COURSE MEASUREMENTS				Years of Record	Past Record Av. Water Content (Inches)
	No. and State	Sec.	Twp. Range		Elev.	Snow Depth (Inches)	1947	1946		
VERDE RIVER	COLORADO RIVER									
Iron Springs*	11 Ariz.	22	14N 3W	6200	0	0	0	--	2	0
Camp Wood	12 "	3	16N 6W	5700	0	0	0	--	2	0
Mingus Mountain	"	3	15N 2E	7100	0	0	--	--	1	0
Mormon Lake*	"	13	18N 8E	7350				--		
Fort Valley*	"	22	22N 6E	7350	T	T	--	--	1	0
Chalender*	"	27	22N 3E	7100	0	0	--	--	1	0
Average for drainage										
LITTLE COLORADO RIVER										
Forestdale*	7 Ariz.	2	9N 21E	6000	0	0	0.3	0.3	9	1.0
McNary	6 "	14	8N 23E	7200	4.1	6.8	0.4	1.5	9	2.5
Nutriosco*	3 "	23	6N 30E	8500	0	0	0.5	1.5	10	1.8
Mormon Lake	"	13	18N 8E	7350			--	--	1	
Fort Valley	"	22	22N 6E	7350	T	T	--	--	1	
Average for drainage										
WILLIAMS RIVER										
Iron Springs	11 Ariz.	22	14N 3W	6200	0	0	0	--	2	0
Camp Wood*	12 "	3	16N 6W	5700	0	0	0	--	2	0
Willow Ranch	"	16	21N 11W	5000	0	0	--	--		
Average for drainage										
GREEN RIVER										
Mulligan Park	24 Wyo.	17	35N 108W	8900	46.0	12.5	9.9	7.8	6	9.3
Kendall R.S.	25 "	23	38N 110W	7900			11.5	5.4		
Loomis Park	26 "	14	37N 111W	8500	50.0	15.0	15.8	9.6	6	13.3
East Rim Divide	44 "	32	37N 111W	7950	32.5	8.2	9.5	6.8	6	8.9
Average for drainage										

*On adjacent drainage

*On adjacent drainage

The following organizations cooperate in the snow surveys and irrigation water supply forecasts for the Colorado, Missouri-Arkansas and Rio Grande watersheds by furnishing funds or services.

STATE

Colorado State Engineer
Wyoming State Engineer
Utah State Engineer
New Mexico State Engineer
Montana State Engineer
Nebraska State Engineer
Colorado Experiment Station
Colorado Extension Service
Montana Experiment Station
Utah Experiment Station

FEDERAL

Department of Agriculture
Forest Service
Soil Conservation Service
Department of Interior
Bureau of Reclamation
Indian Service
Geological Survey
National Park Service
Department of Commerce
Weather Bureau
War Department
Army Engineer Corps

PUBLIC UTILITIES

Colorado Public Service Company
Western Colorado Power Company
Montana Power Company
Denver and Rio Grande Western R. R. Company

MUNICIPALITIES

City of Bozeman
City of Denver
City of Boulder

WATER USERS ORGANIZATIONS

Poudre Valley Water Users' Association
Arkansas Valley Ditch Association
Colorado River Water Conservation District

IRRIGATION PROJECTS

Farmers Reservoir and Irrigation Company
San Luis Valley Irrigation District
Santa Maria Reservoir Company
Costilla Land Company
Uncompahgre Valley Water Users' Association
Wyoming Development Company
Goshen Irrigation District
Kendrick Project
Pathfinder Irrigation District
Salt River Valley Water Users' Association
San Carlos Irrigation and Drainage District
Twin Lakes Reservoir and Canal Company

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